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**Li et al.**

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(54) **PROTECTIVE CASE SYSTEM FOR USE WITH ELECTRONIC DEVICE**

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(58) **Field of Classification Search**

CPC ..... B60R 11/0241; A45C 11/00; F16M 13/02; H04B 1/3888

See application file for complete search history.

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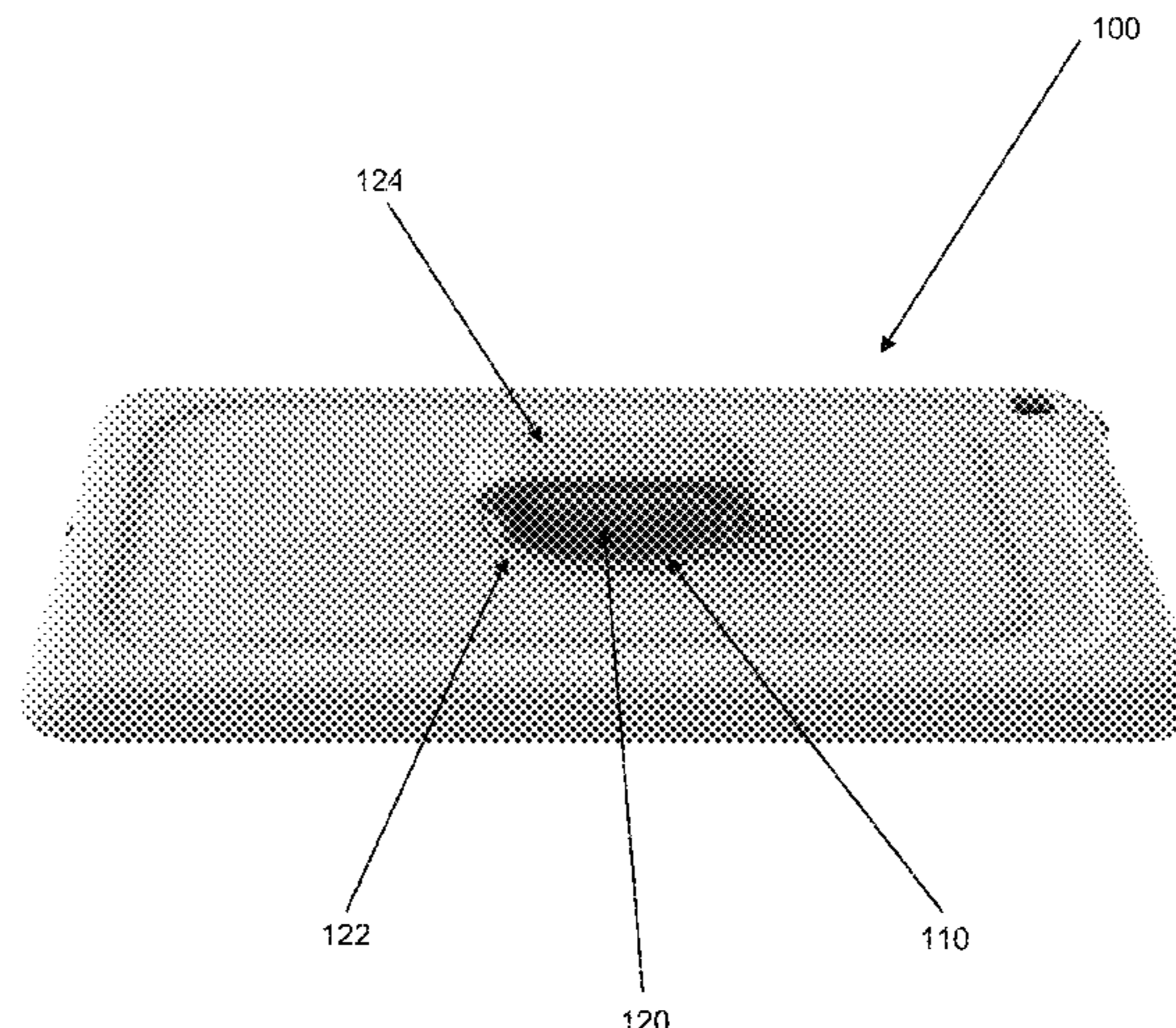
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*Primary Examiner* — Simon King

(57) **ABSTRACT**

A protective case system for use with an electronic device includes a protective case, a handle, and an adapter. The protective case removably receives the electronic device and a display screen of the electronic device remains accessible when the electronic device is installed in the protective case. The handle extends outward from the protective case. The handle is configured for carrying the protective case and the installed electronic device. The adapter is configured to attach to the handle and be bendable by a user to a plurality of positions. The adapter is configured to function as a multi-position stand for the protective case and the installed electronic device. The adapter is further configured to removably affix the protective case and the installed electronic device to a seat.

**20 Claims, 15 Drawing Sheets**



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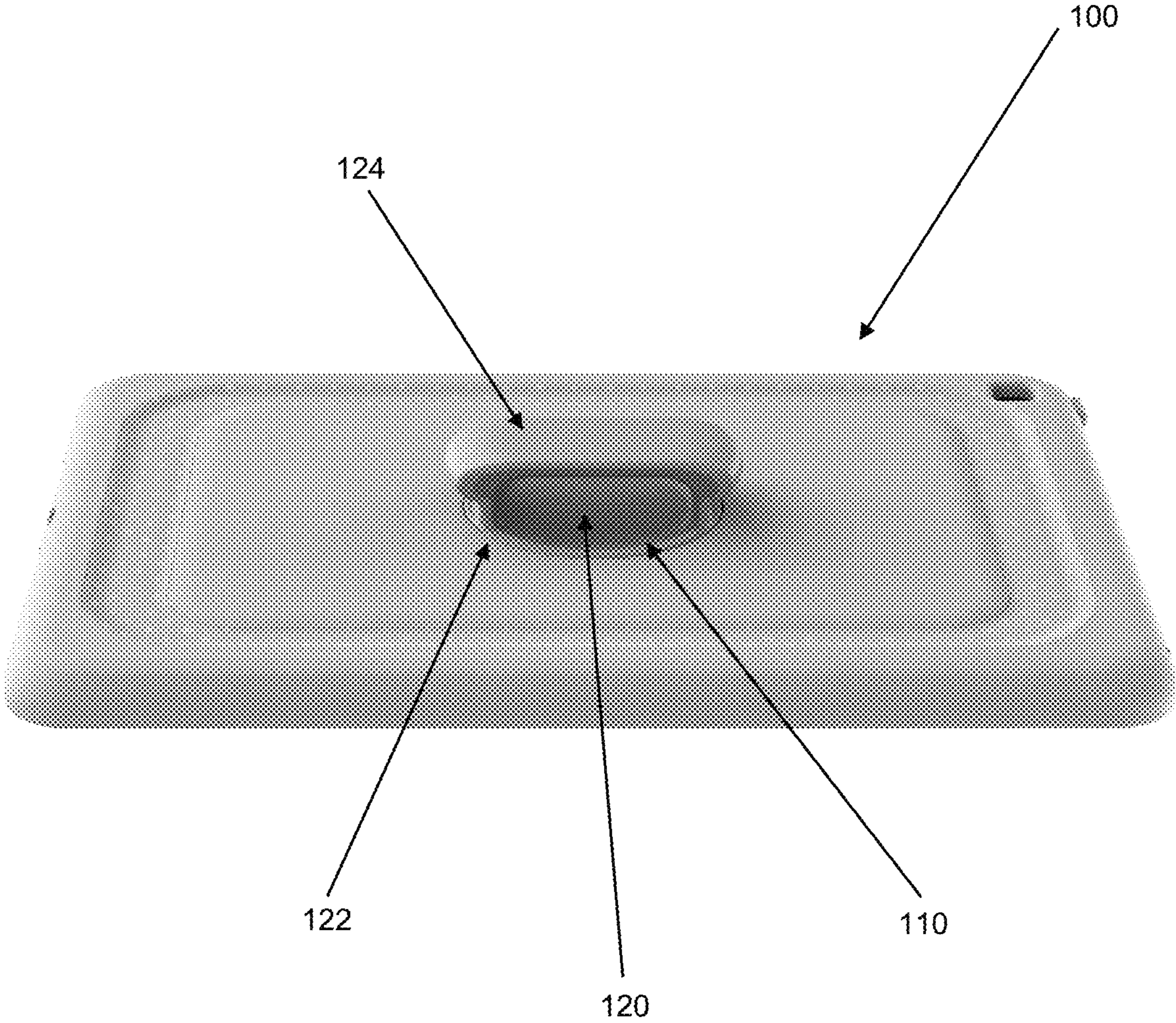


Figure 1

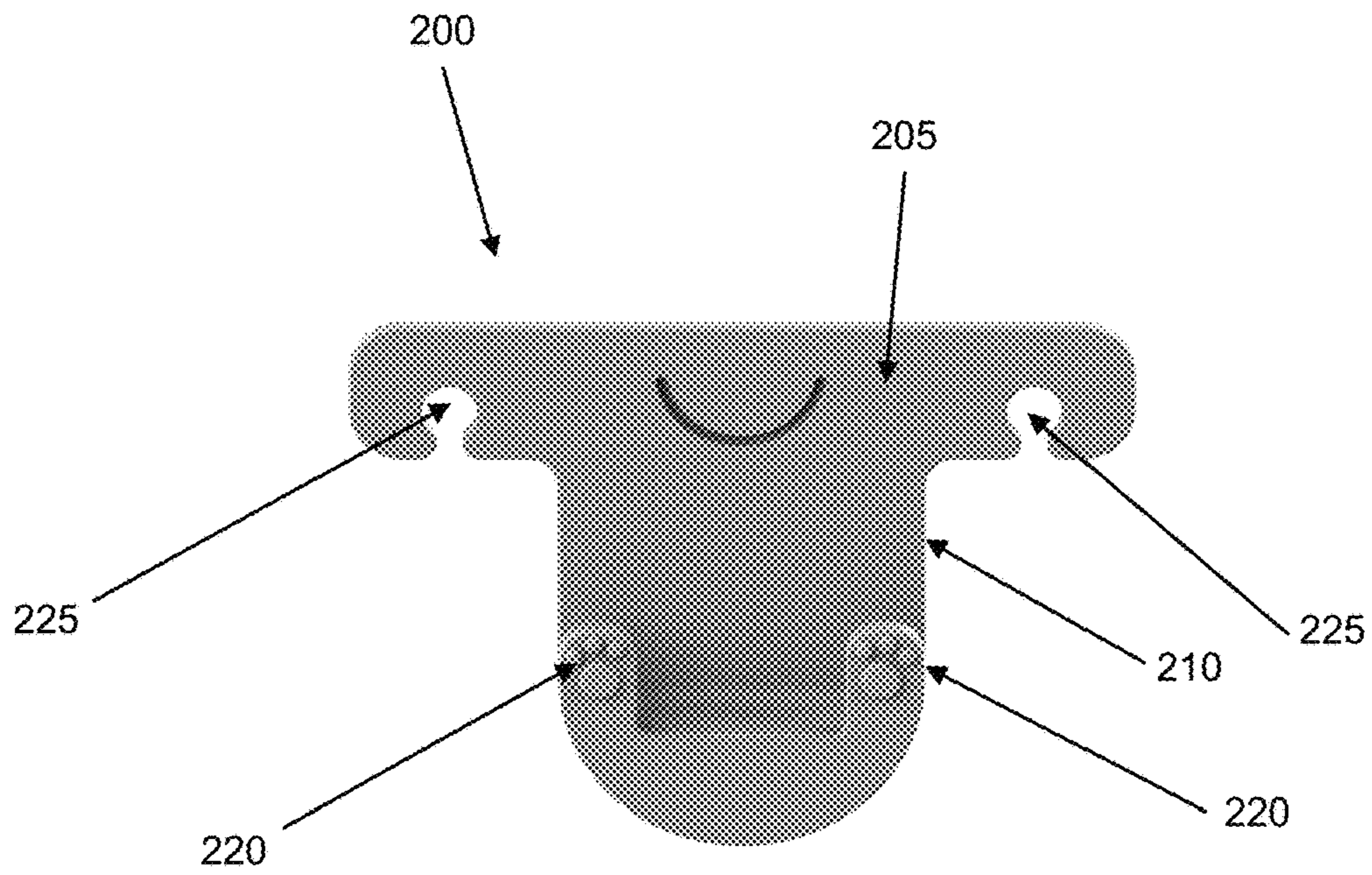


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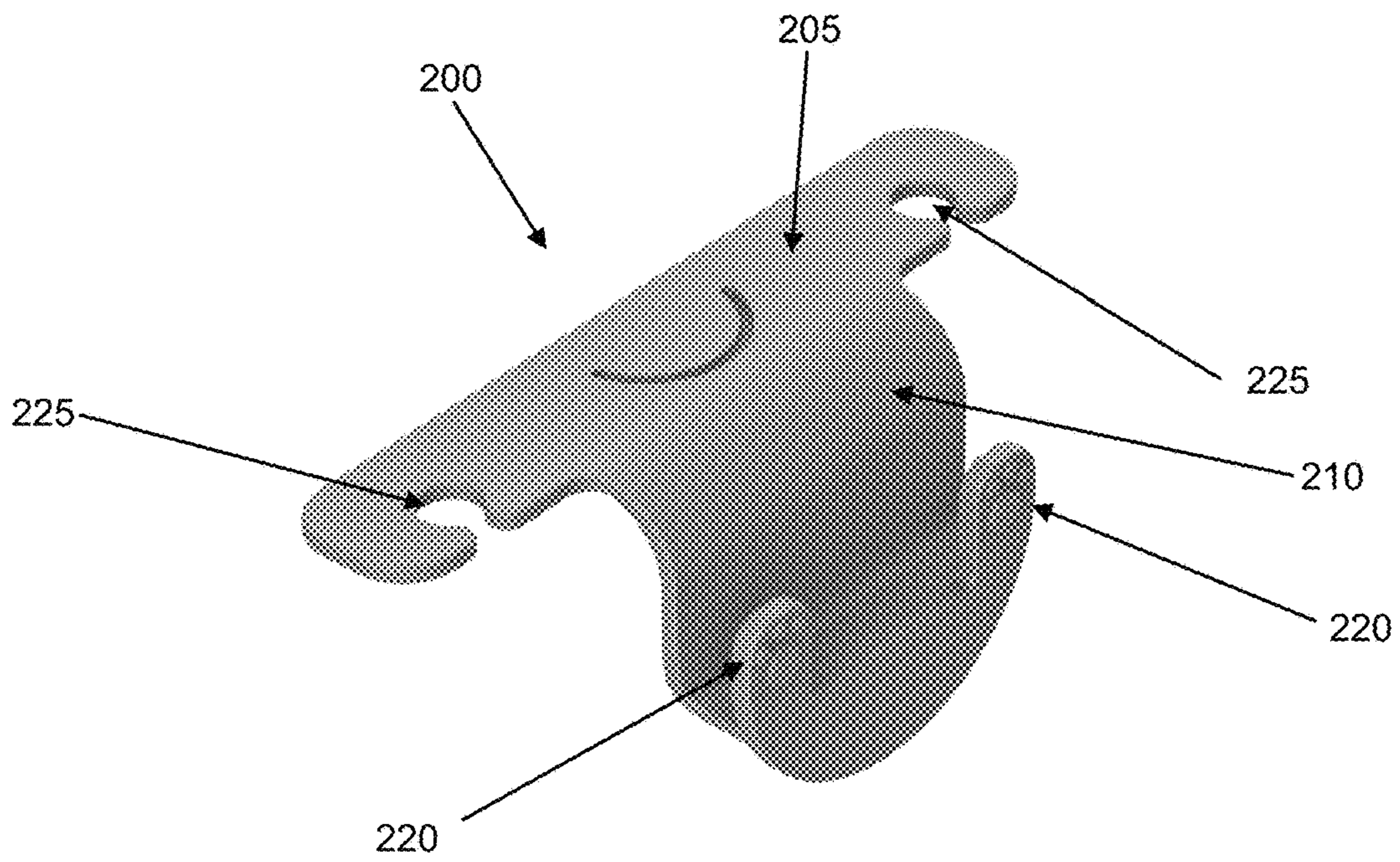


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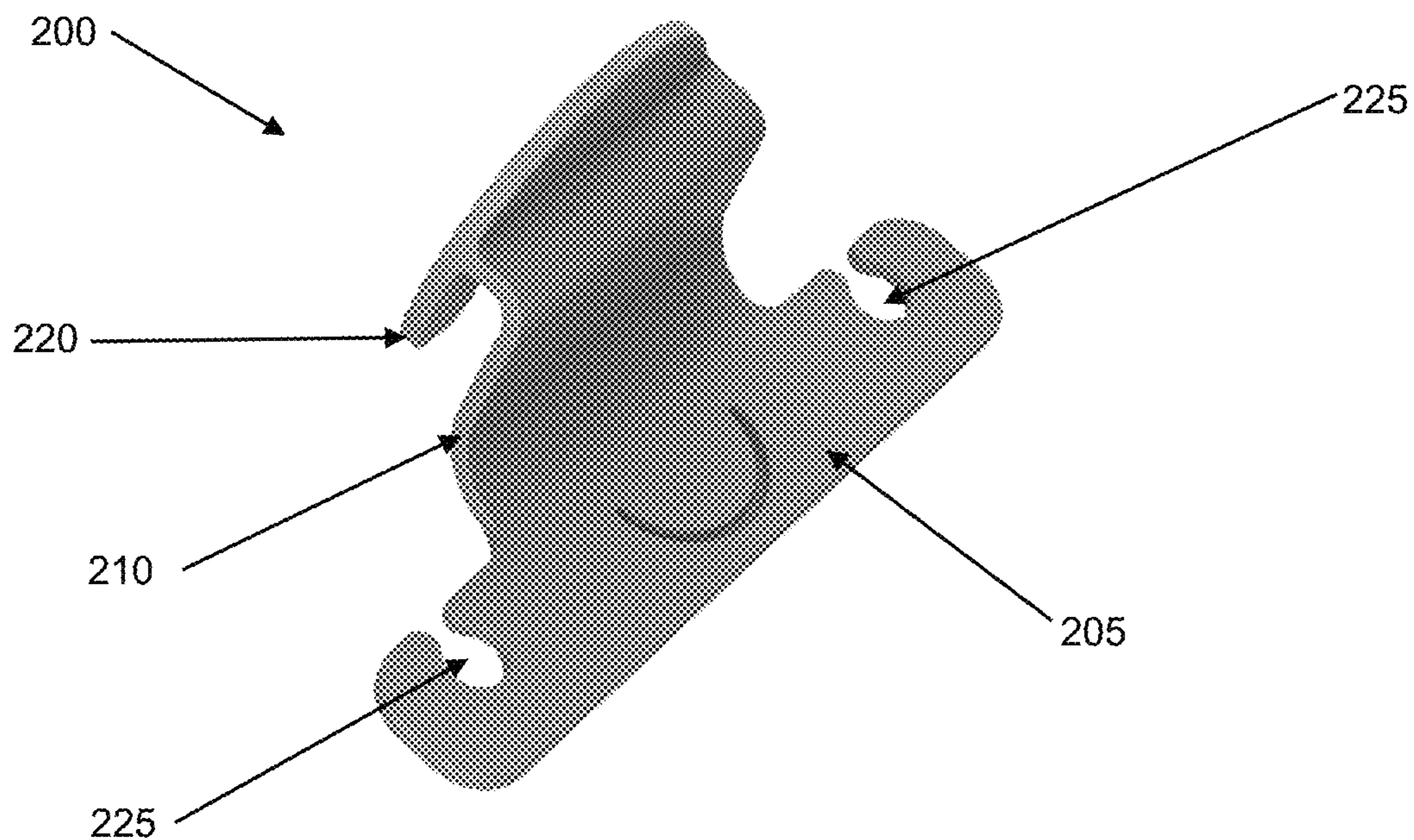


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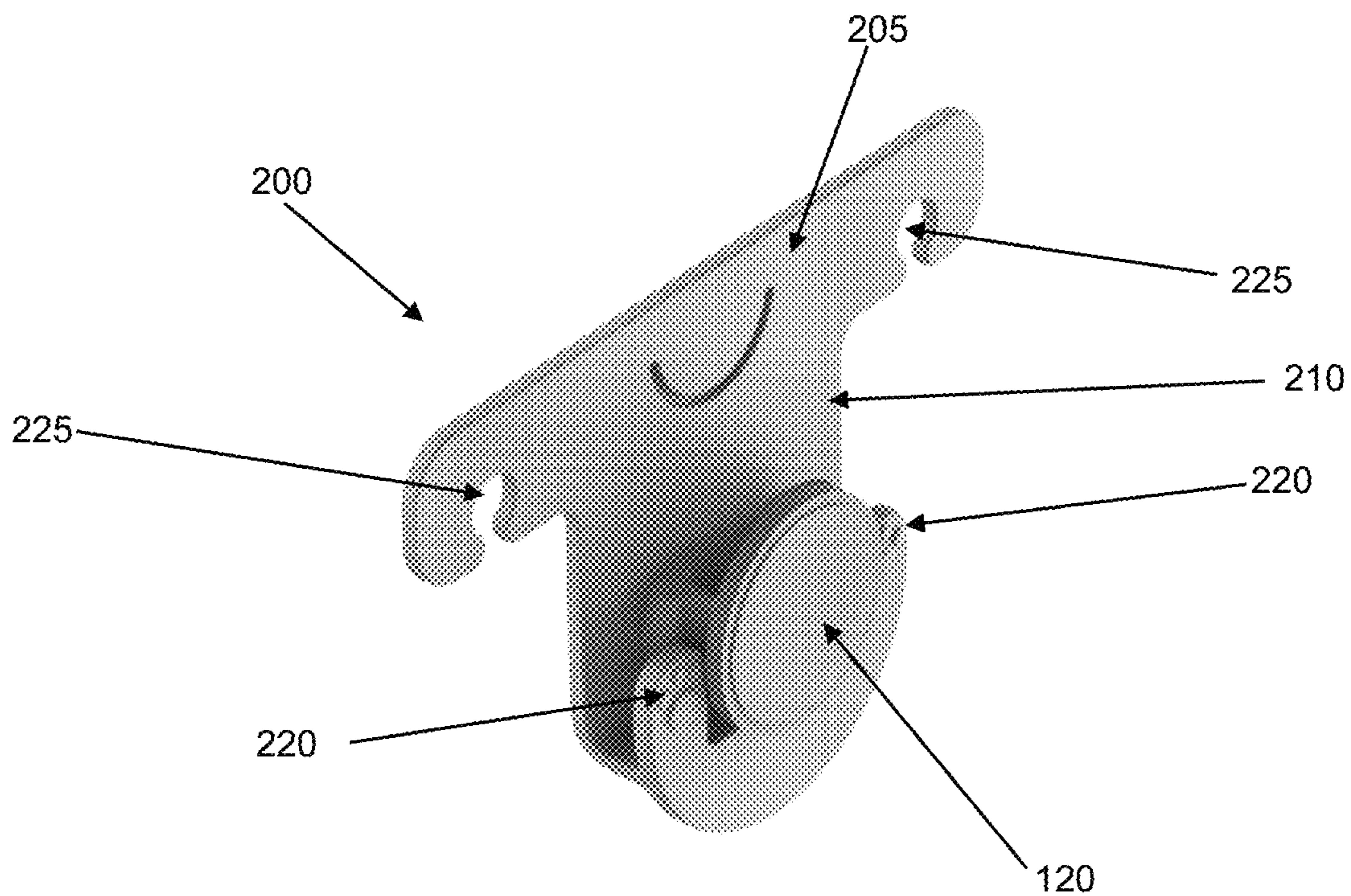


Figure 2D

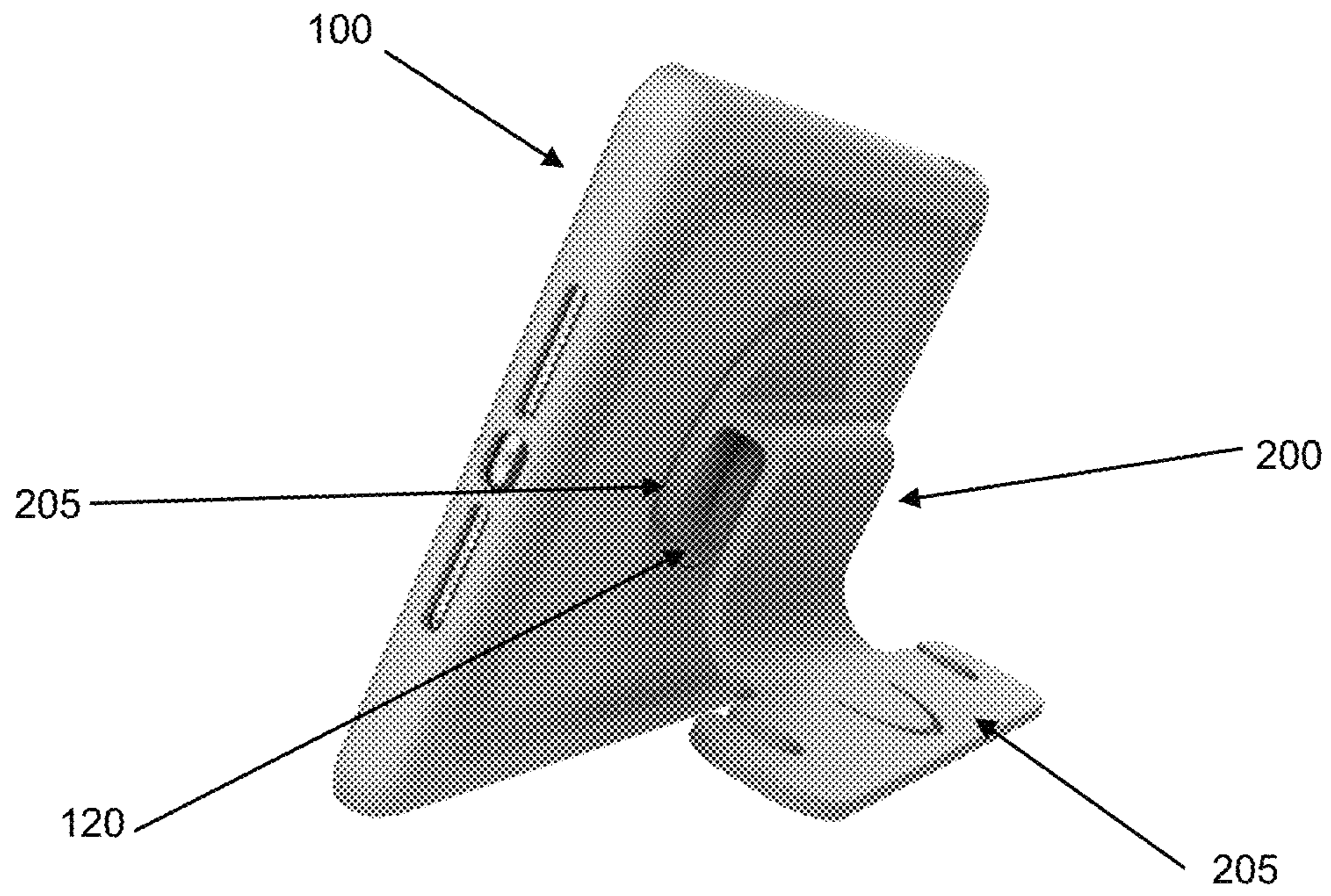


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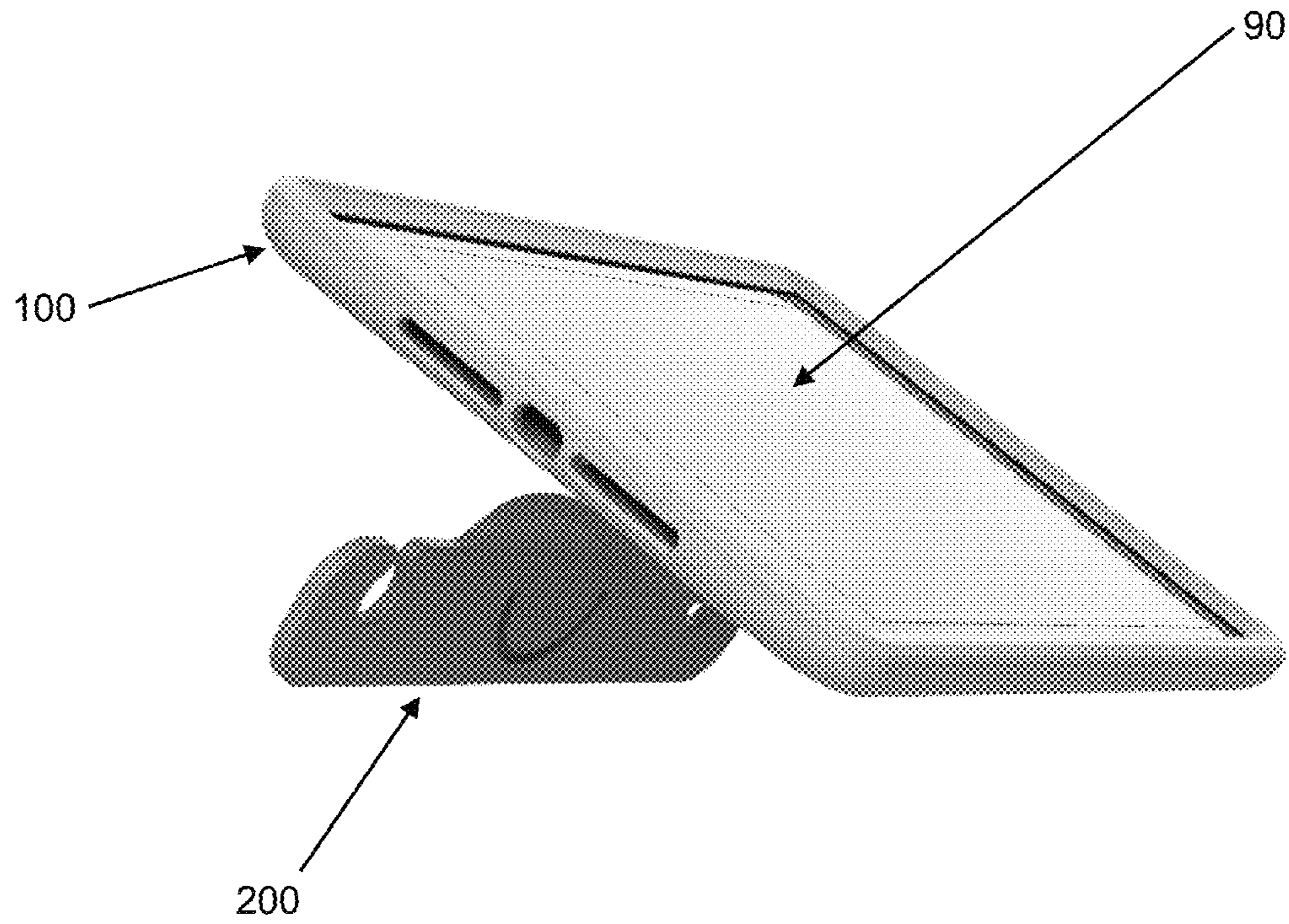


Figure 3B



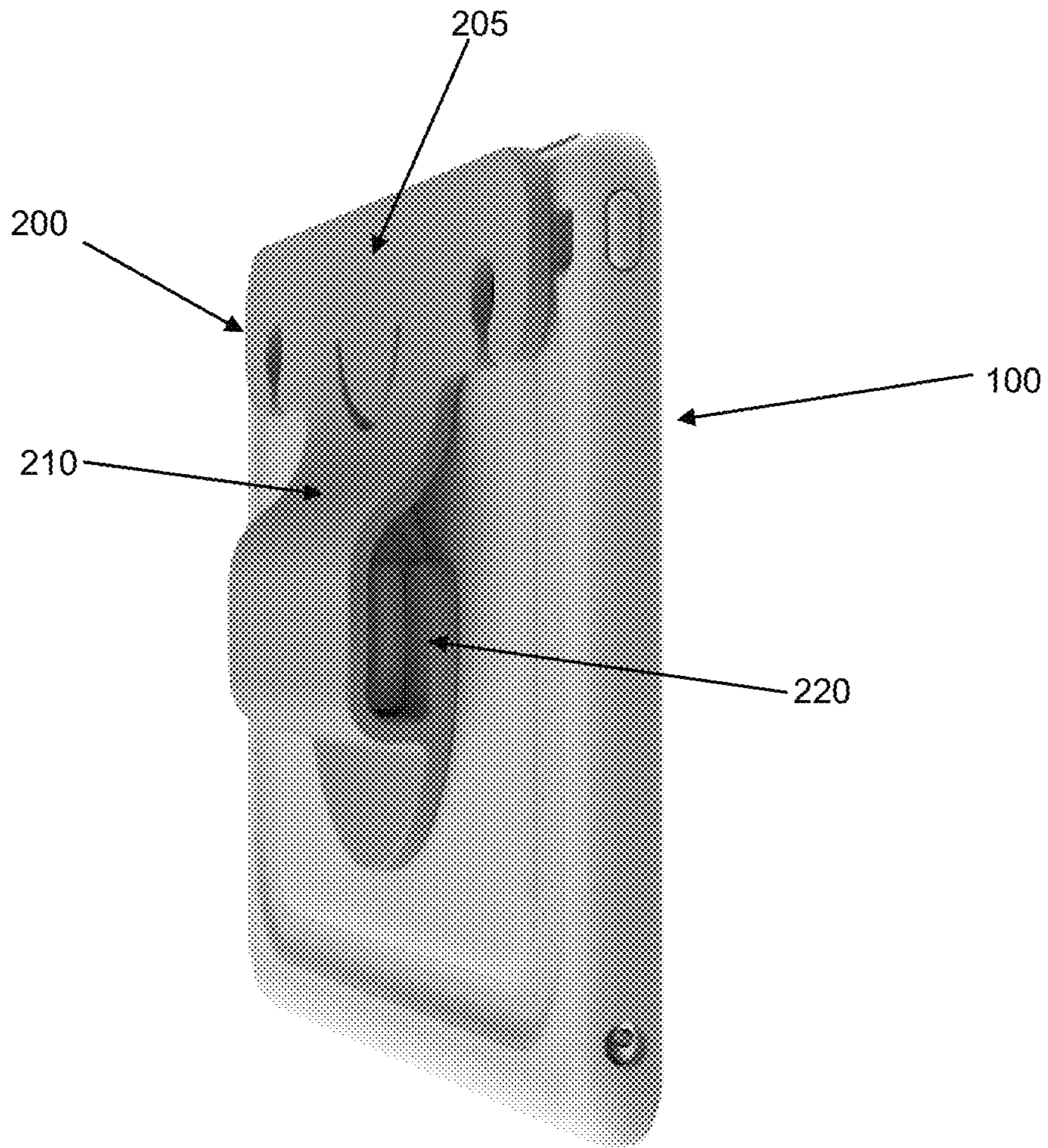


Figure 3C

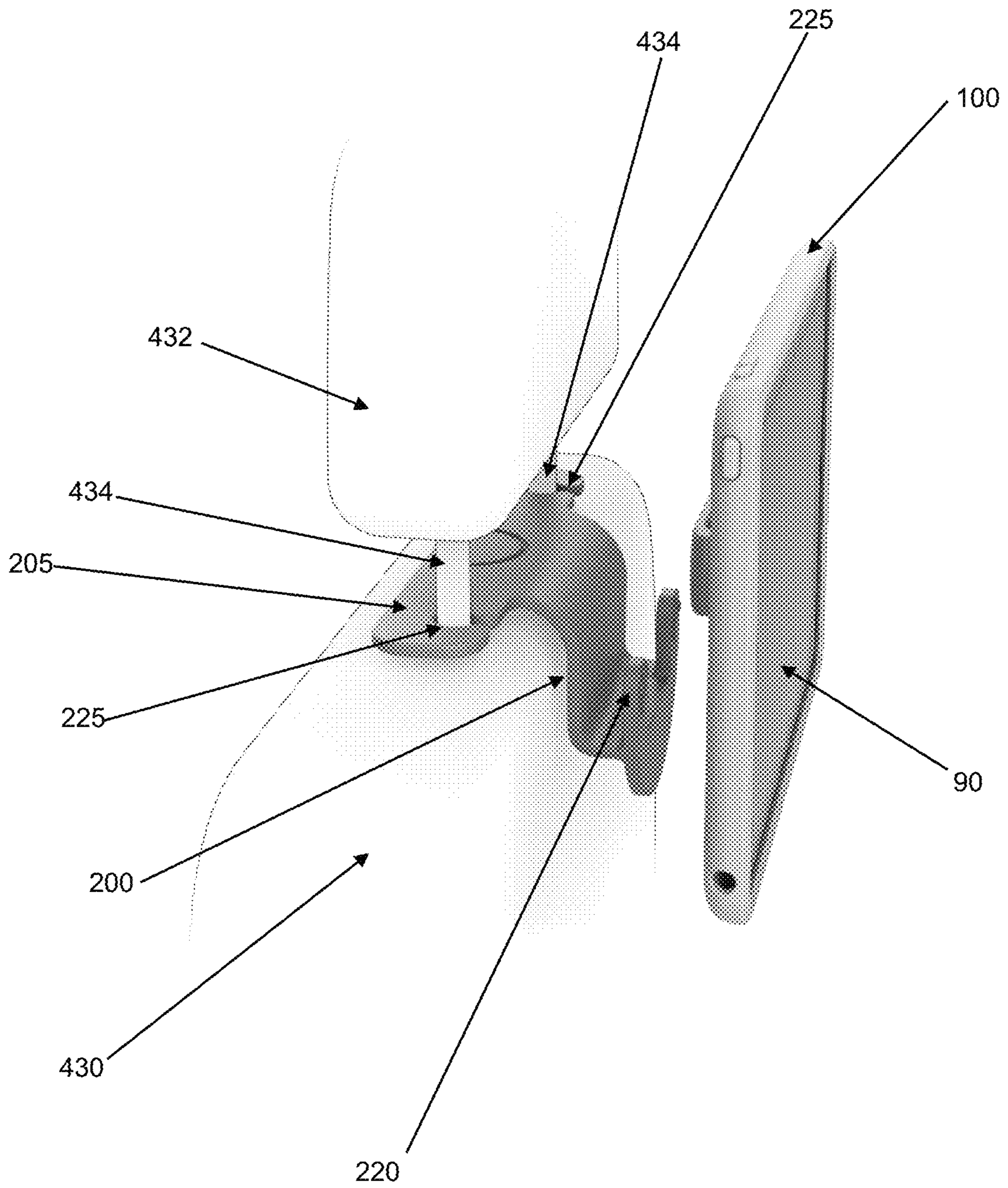


Figure 4

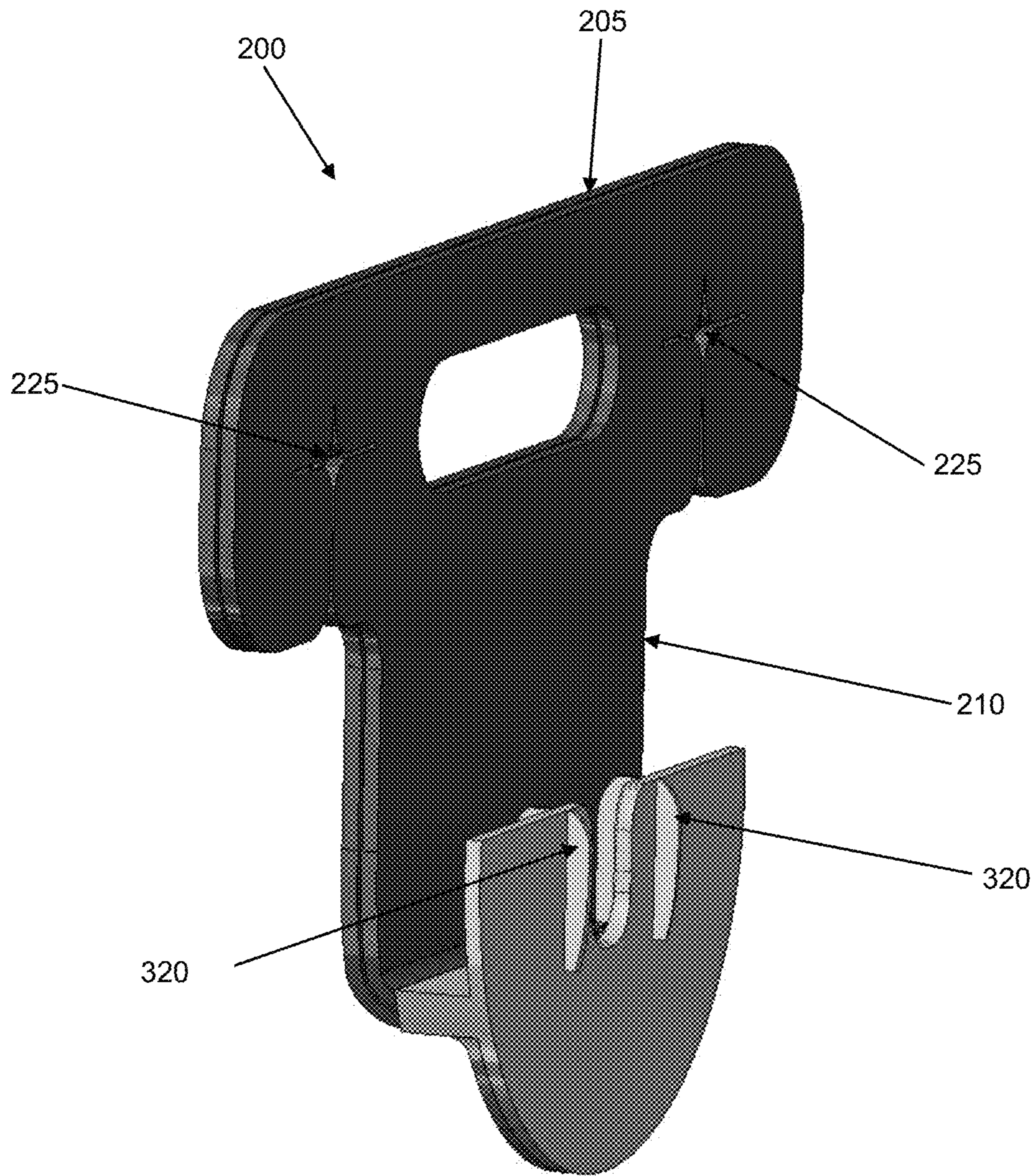


Figure 5

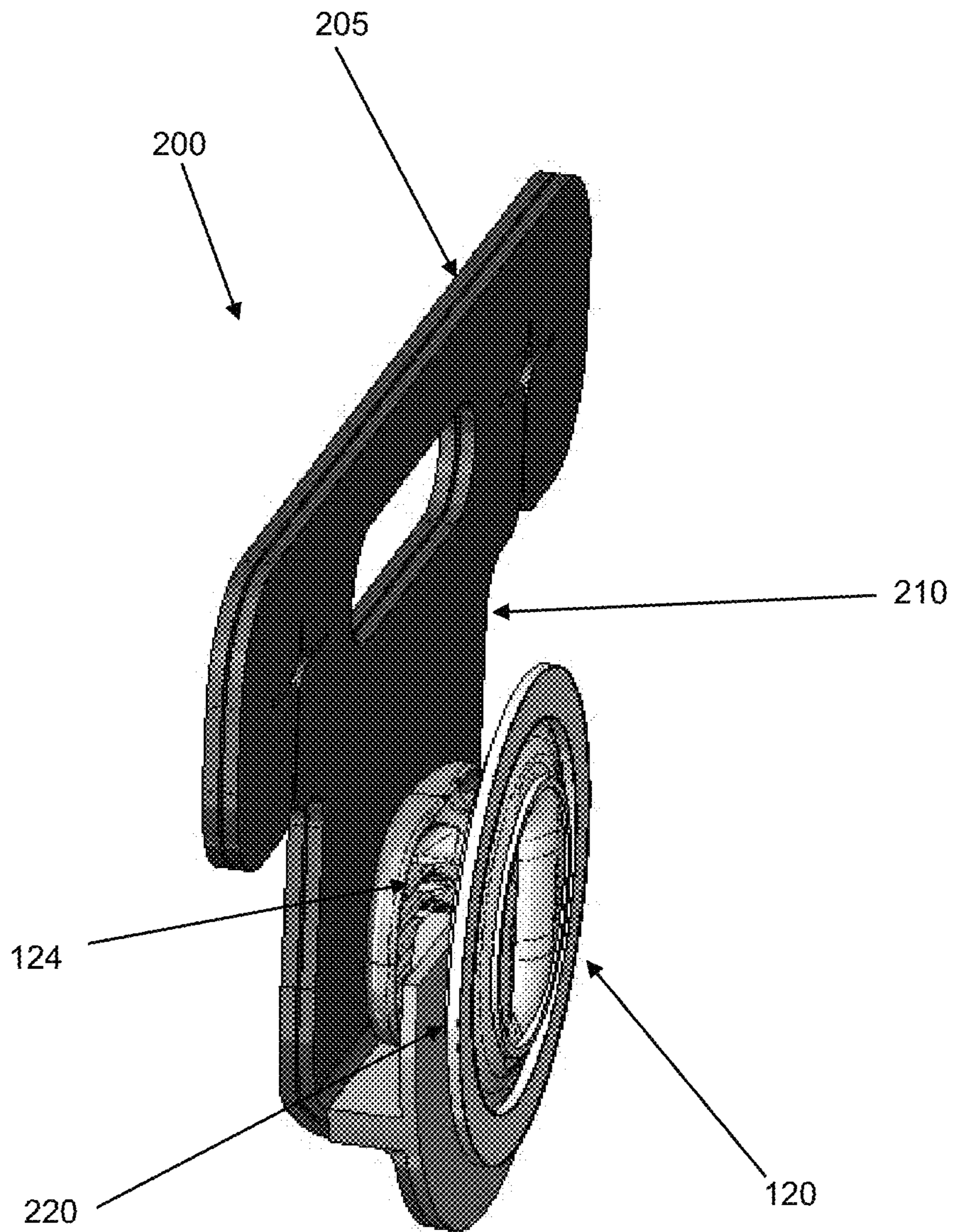


Figure 6

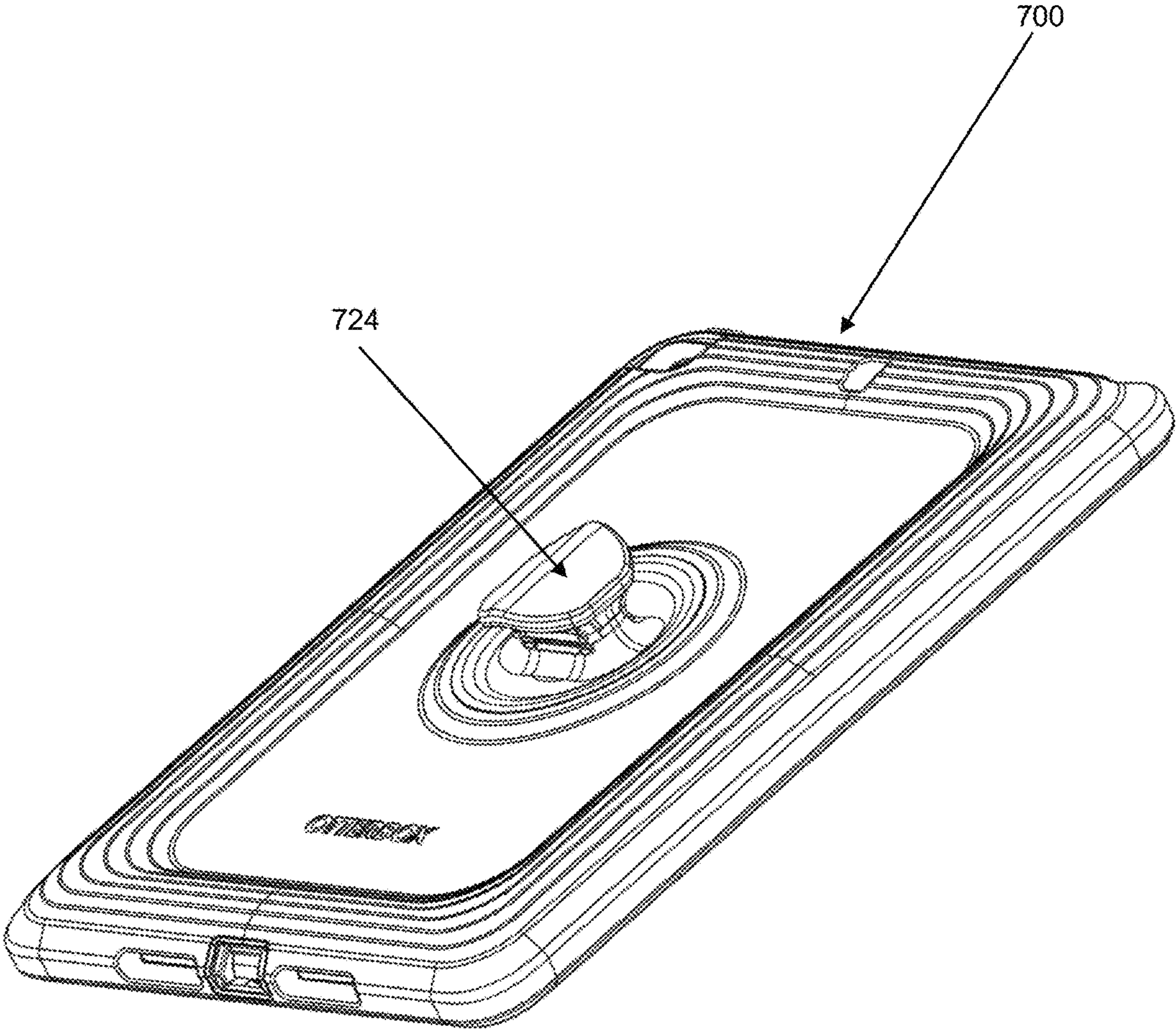


Figure 7

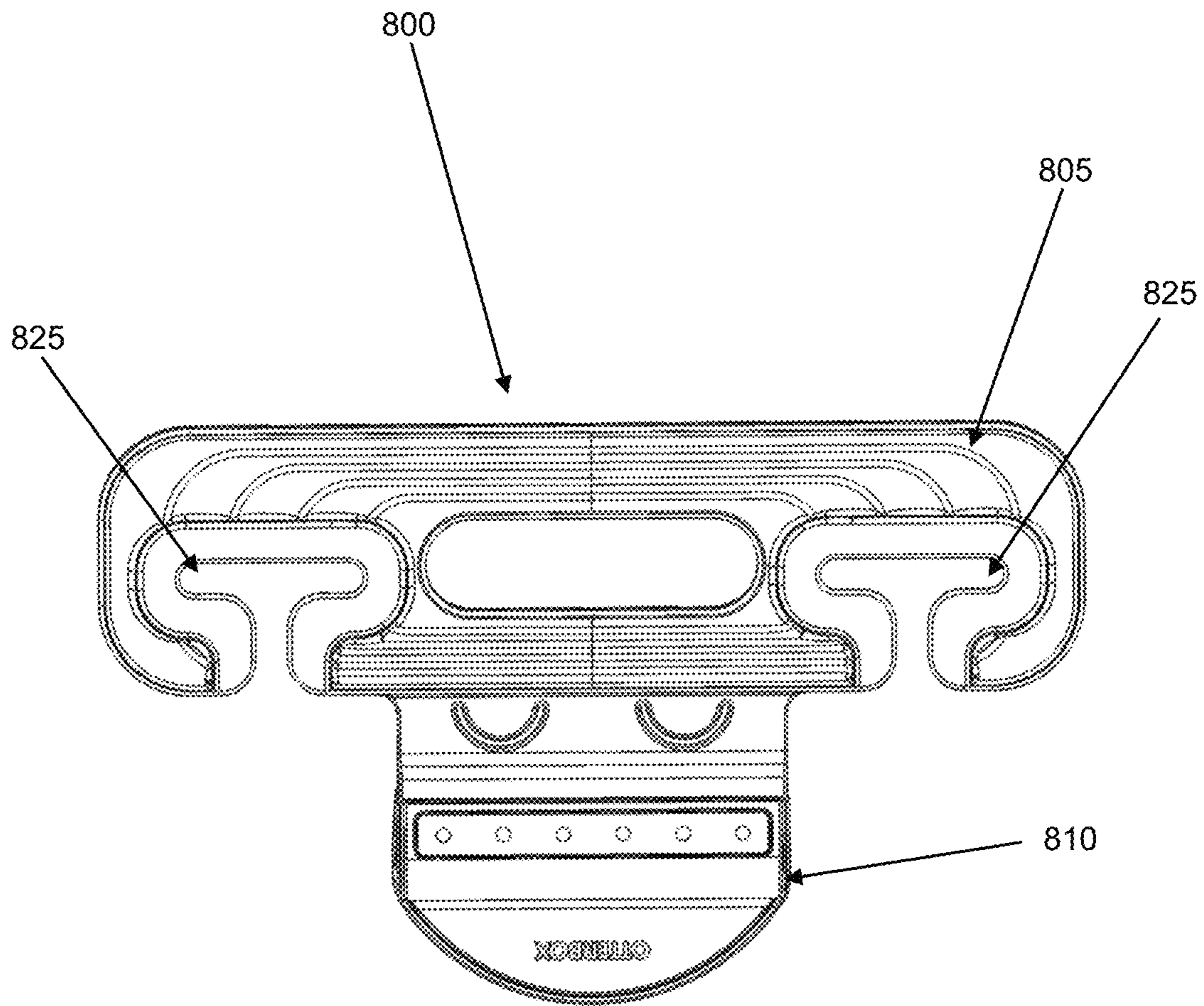


Figure 8

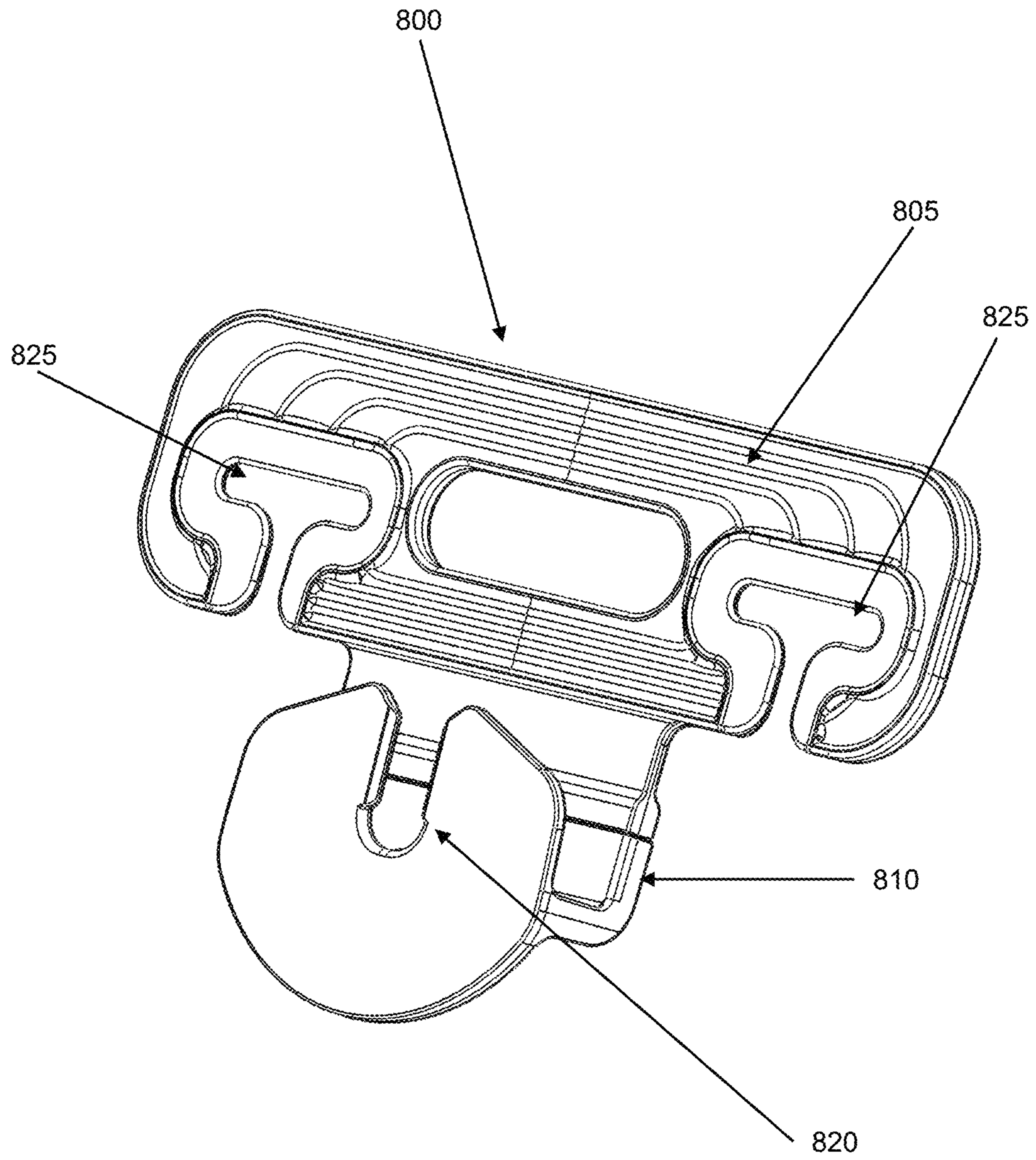


Figure 9

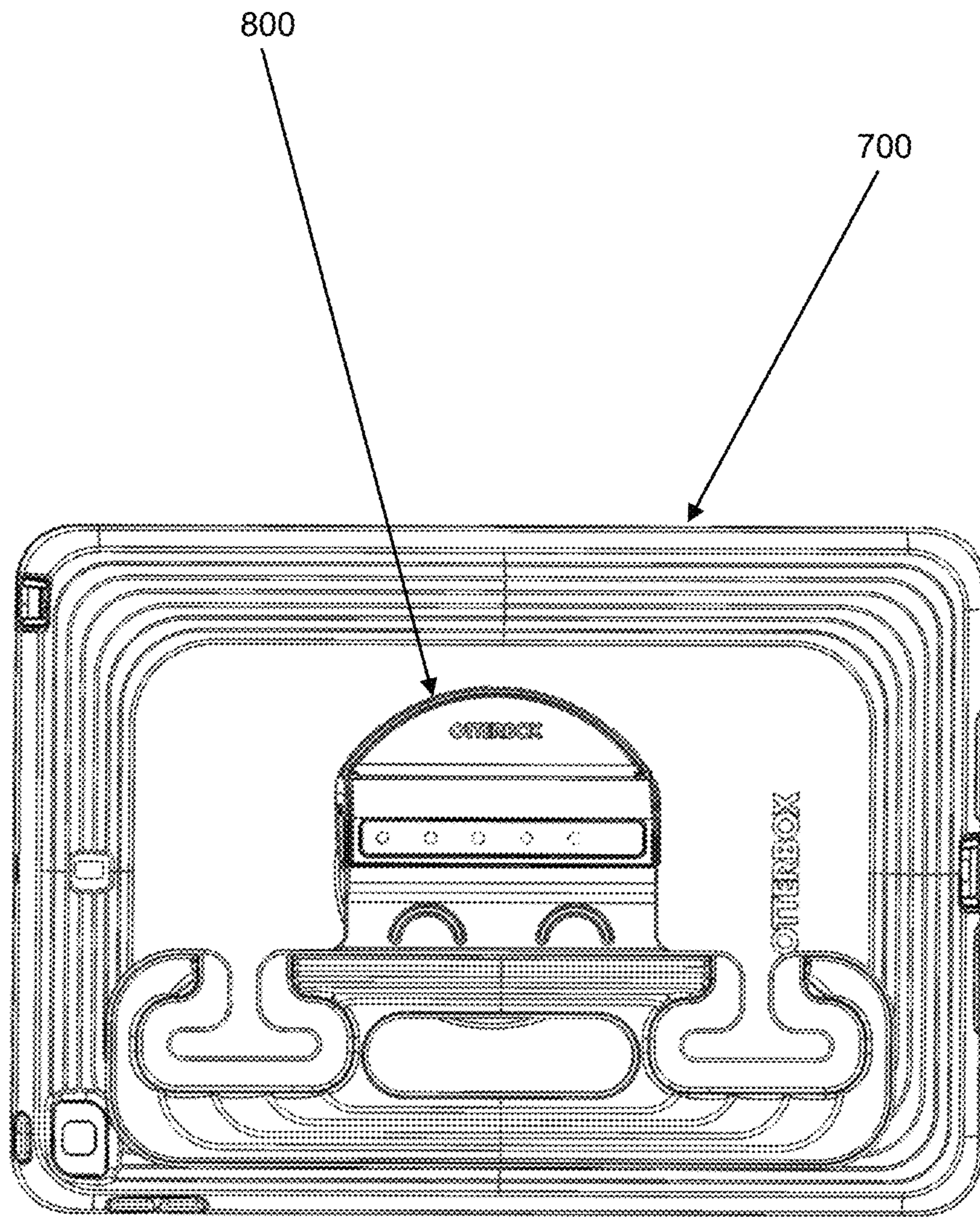


Figure 10



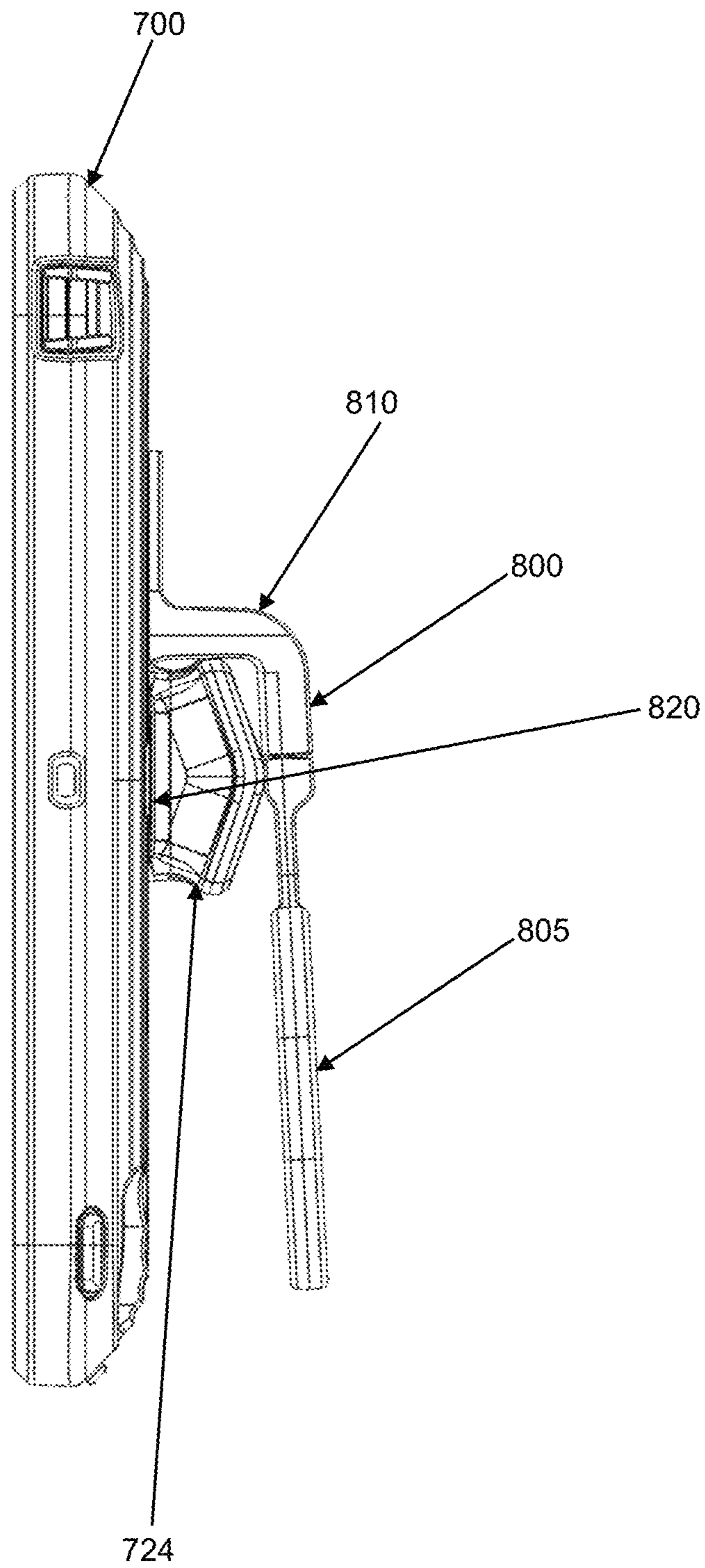


Figure 11

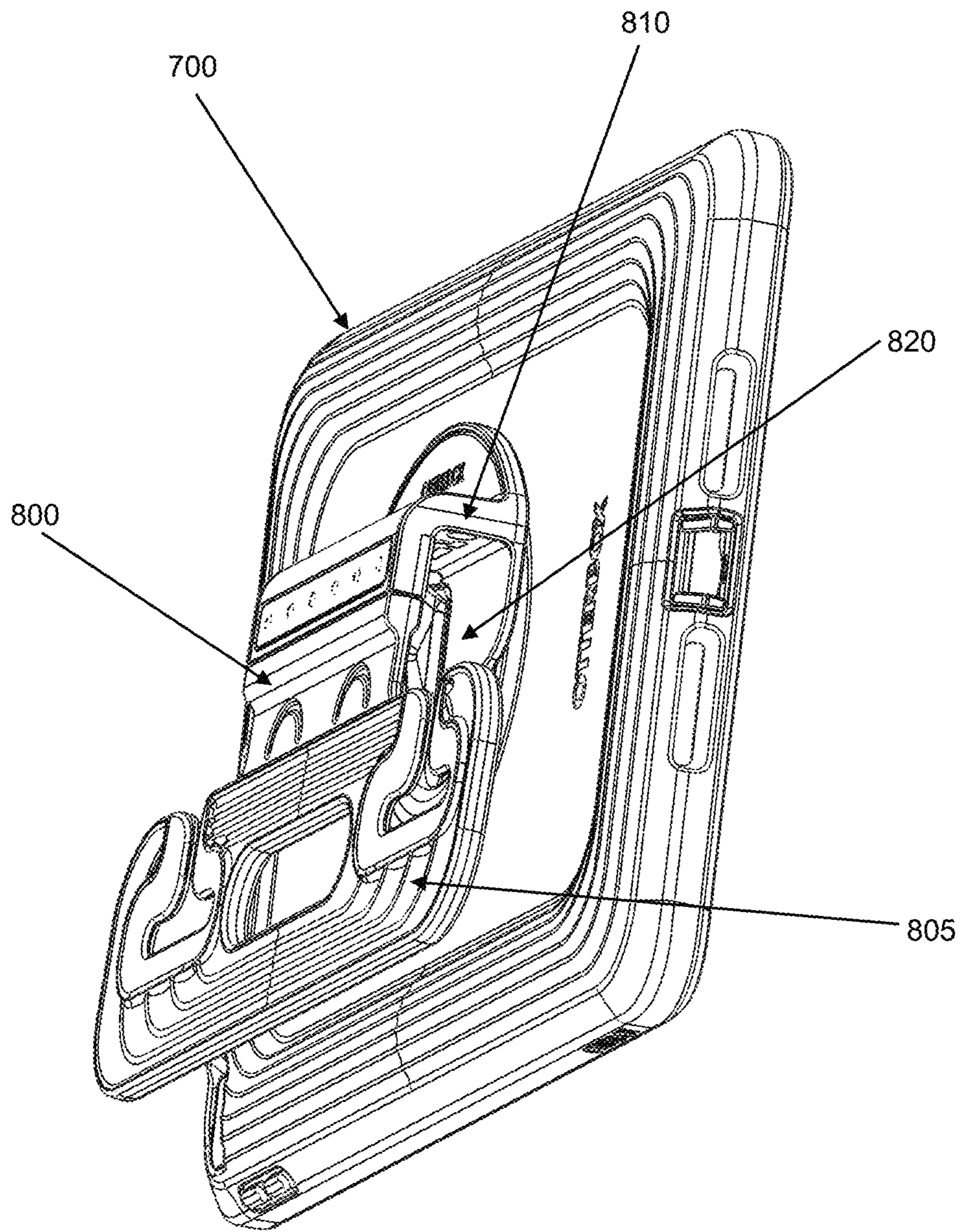


Figure 12

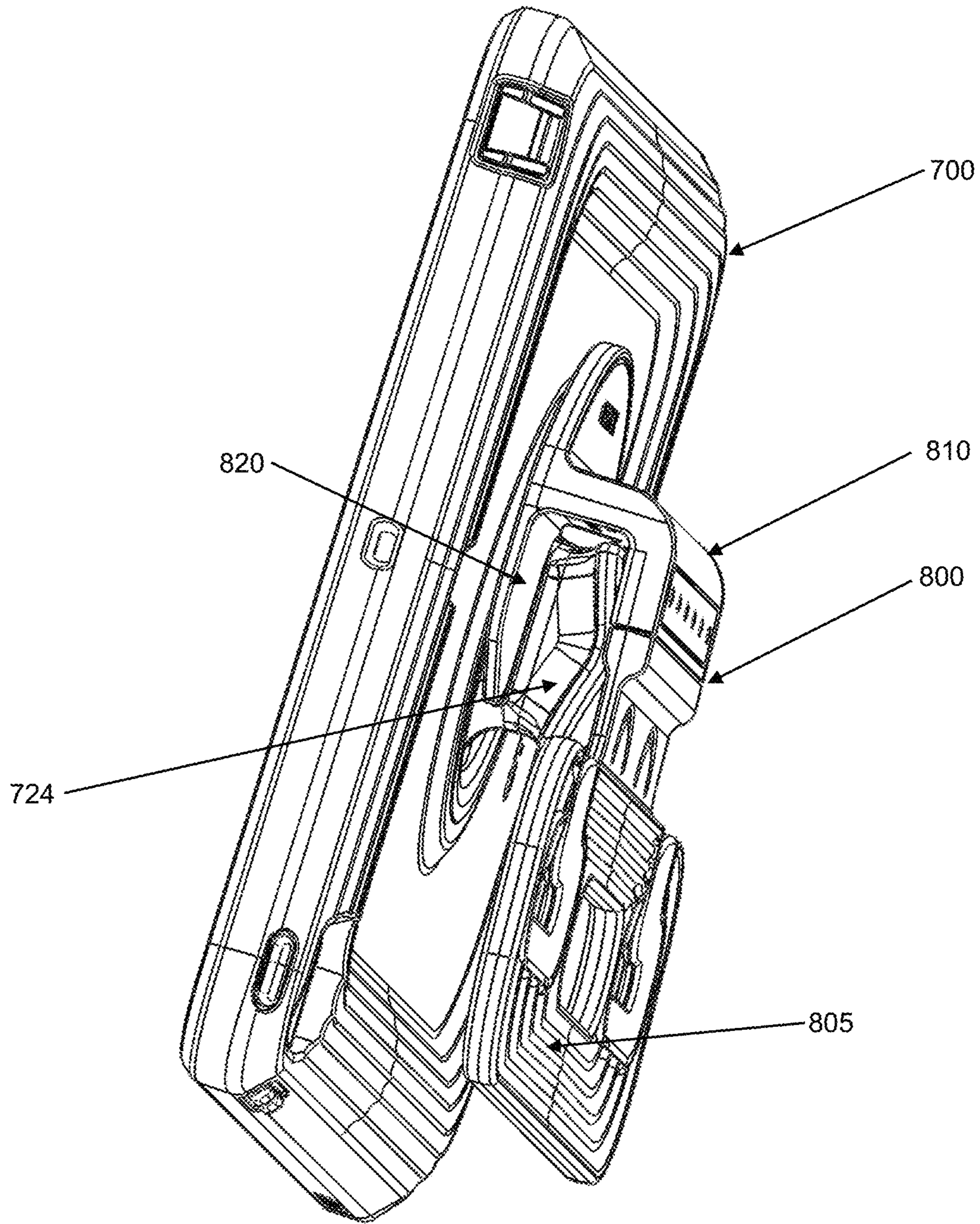


Figure 13

**1****PROTECTIVE CASE SYSTEM FOR USE  
WITH ELECTRONIC DEVICE**

## RELATED APPLICATIONS

This application claims priority to U.S. patent application Ser. No. 17/168,258, filed Feb. 5, 2021, which claims priority to U.S. Provisional Patent Application No. 63/020,619, filed May 6, 2020, all of which are hereby incorporated by reference in their entireties.

## BACKGROUND

Personal electronic devices are commonly used for communication and entertainment, as well as for a variety of other purposes. Examples of personal electronic devices include smartphones, tablet computers, gaming devices, audio players, video players, cameras, portable computers, two-way radios, GPS receivers, and/or other portable devices. Tablet computers have become more common and are often used by children, and often in a portable manner. It is not only desirable to have protective cases that protect these types of electronic devices from damage, but also include features for making them easier to carry as well as making them attachable to other objects.

## SUMMARY

In one exemplary embodiment, a protective case system for use with an electronic device includes a protective case, a handle, and an adapter. The handle is removably attachable at a back surface of the protective case. The handle is configured for carrying the protective case and the electronic device when the handle is attached to the protective case and the electronic device is installed in the protective case. The adapter is removably attachable to the handle and is configured to function as a stand for the protective case. The adapter is further configured to removably attach to headrest posts of a seat.

In another exemplary embodiment, a protective case system for use with an electronic device includes a protective case, a handle, and an adapter. The protective case removably receives the electronic device and a display screen of the electronic device remains accessible when the electronic device is installed in the protective case. The handle is attached to and extends outward from a back surface of the protective case. The handle is configured for carrying the protective case and the installed electronic device. The adapter is configured to be removably attachable to the handle and bendable by a user to a plurality of positions. The adapter is configured to function as a multi-position stand for the protective case and the installed electronic device. The adapter is further configured to removably affix the protective case and the installed electronic device to a seat.

While several examples are provided above for purposes of illustration and description, other modifications and variations may be possible in view of the teachings herein. The embodiments described herein illustrate and explain the principles of the concept and its practical application to enable others skilled in the art to best utilize the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an assembly including a case with a handle attachment;

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FIG. 2A illustrates an adapter for use with the assembly of FIG. 1;

FIG. 2B illustrates another view of the adapter of FIG. 2A;

5 FIG. 2C illustrates another view of the adapter of FIG. 2A;

FIG. 2D illustrates the adapter of FIG. 2A with the handle attachment of FIG. 1;

10 FIG. 3A illustrates the assembly of FIG. 1 in use with the adapter of FIG. 2A;

FIG. 3B illustrates the assembly of FIG. 3A in a different orientation;

FIG. 3C illustrates another orientation of the assembly of FIGS. 3A and 3B;

15 FIG. 4 illustrates the assembly of FIGS. 3A-3C in use with a seat;

FIG. 5 illustrates another adapter for use with the assembly of FIG. 1; and

20 FIG. 6 illustrates the adapter of FIG. 5 with a handle attachment;

FIG. 7 illustrates a case with a handle;

FIG. 8 illustrates an arm for use with the case of FIG. 7;

FIG. 9 illustrates another view of the arm of FIG. 8;

25 FIG. 10 illustrates a rear view of the case of FIG. 7 with the arm of FIG. 8;

FIG. 11 illustrates a side view of the assembly of FIG. 10;

30 FIG. 12 illustrates a rear perspective view of the assembly of FIG. 10;

FIG. 13 illustrates an alternative rear perspective view of the assembly of FIG. 10.

## DETAILED DESCRIPTION

Electronic devices are increasingly used with protective cases that protect the electronic devices from a variety or forces or elements such as: dropping, impact, scratching, water, dirt, dust, rain, snow, and/or chemicals. Children use electronic devices more and more frequently. Children often use tablet computers for entertainment, education, and/or gaming and may use them in a variety of different locations or settings. It is desirable to provide accessories which enable people, and particularly children, to more easily carry the electronic devices as well as use them in a variety of settings. Some desirable improvements include carrying handles, stands which can be adapted to a variety of situations, and adapters for conveniently attaching to a car headrest.

While most of the electronic device cases disclosed herein are described as “protective” cases, the apparatuses and techniques disclosed herein related to removable modules do not necessarily require that the case is protective and could apply to any type of electronic device case, cover, sleeve, sheath, attachment panel, etc. In other examples, the case may be water resistant or water proof for protecting the electronic device from water or other liquids. In yet other examples, the case may have other characteristics, such as but not limited to, chemical resistance and antimicrobial characteristics. Moreover, while the electronic device cases disclosed herein are generally understood to serve as after-market accessories for original equipment electronic devices (i.e., smartphones, tablet computers, gaming devices, audio players, video players, cameras, portable computers, two-way radios, GPS receivers, other portable devices, etc.), the apparatuses and techniques described herein could also be applied to the primary housings of original equipment electronic devices themselves. Further, while many of the uses described herein are described with respect to use by

kids or children, the apparatuses and techniques described herein are equally applicable to a variety of types of users or use scenarios.

FIG. 1 illustrates an exemplary case 100 for use with an electronic device 90 (not shown in FIG. 1, but shown in at least FIGS. 3B and 4), such as a smartphone, a tablet computer, a gaming device, an audio player, a video player, a camera, a portable computer, a two-way radio, a GPS receiver, and/or another portable device. Case 100 may include an inner liner and an outer shell. Case 100 may include various openings or apertures for accessing features of electronic device 90. Case 100 may also include features for actuating buttons or switches of electronic device 90. Case 100 may be protective, chemical-resistant, antibacterial, water-resistant, and/or waterproof.

As illustrated in FIG. 1, case 100 includes a receiver 110 for receiving a handle attachment 120. Receiver 110 may include a receiver area, a recess, a hole, a slot, one or more attachment mechanisms, threads, tabs, clips, snaps, ridges, a friction fit, and/or an interference fit for removably or releasably attaching handle attachment 120 to case 100. Handle attachment 120 includes a handle base 122 and a handle 124. Handle base 122 is received by or attaches to receiver 110 of case 100. In some examples, handle base 122 may temporarily or removably attach to receiver 110 in a rotational or twist-lock manner. While handle attachment 120 is attached to case 100, handle 124 can be used to carry case 100 along with any installed electronic device. The size, shape, and/or orientation of handle 124 may make it easier to carry case 100, particularly for a child. Handle 124 may also make it less likely that case 100 and the associated electronic device are accidentally dropped. Handle 124 may have other shapes, sizes, and/or configurations.

FIG. 2A illustrates an adapter 200 for use with case 100 and handle attachment 120. Adapter 200 includes an adapter foot portion 205 and an adapter body portion 210. While specific shapes are illustrated in the figures herein, many other shapes are possible. Adapter foot portion 205 includes post receivers 225 which are discussed in more detail with respect to FIG. 4. At an opposite end of adapter 200 from adapter foot portion 205, adapter 200 also includes clips 220 which are discussed in more detail with respect to FIG. 2D. Adapter 200 may also be referred to as an arm, a stand, or an accessory.

Adapter body 210 is formed, at least in part, from a flexible, bendable, or pliable material that is bendable and retains its shape after being bent, at least in part. Adapter body 210 may also later be bent to a different shape. Many materials are possible. In some cases, adapter body 210 may be formed from a shape memory material. FIG. 2B illustrates adapter 200 where adapter body 210 has been bent to a roughly 90 degree angle. It remains in that shape until it is bent back, or bent to another shape or configuration. FIG. 2C illustrates an opposite side view of adapter 200 of FIG. 2B.

FIG. 2D illustrates adapter 200 with handle attachment 120 inserted and temporarily attached, affixed, or retained by clips 220. Clips 220 may be flexible and may flex to removably or temporarily hold handle attachment 120 with an interference fit, a friction fit, and/or a snap fit such that it remains attached for use, but can be removed if a sufficient force is applied.

FIG. 3A illustrates the assembly of FIG. 2D with handle attachment 120 attached to case 100. In this configuration, adapter 200 acts as an adjustable stand for holding case 100 in a viewing orientation on a horizontal, or substantially horizontal, surface. Adapter body 210 can be bent to adjust

the viewing angle of the assembly. For example, FIG. 3B illustrates the assembly of FIG. 3A in a different viewing orientation. Adapter body 210 may be bent to different angles or positions to accommodate different situations or environments. When not in use as a stand, adapter 200 can be folded flat, or nearly flat, to reduce the amount of space it takes up. For example, FIG. 3C illustrates the assembly of FIG. 3B with adapter 200 folded flat, or substantially flat.

FIG. 4 illustrates the assembly of FIGS. 3A-3C in use with a seat 300. Seat 300 may be an automobile seat and includes a headrest 432 with headrest posts 434. Adapter 200 includes post receivers 225 to hang or temporarily attach adapter 200 to posts 434 for temporarily holding case 100 and electronic device 100 in a viewing position on or behind seat 430. Receivers 225 may include some flexible, spongy, or resilient material for accommodating a variety of post sizes and/or post spacings. The flexible or resilient material may enable the receivers 225 to accommodate these dimensional variations while still holding the assembly somewhat snugly in place when used with a particular seat. Receivers 225 may also include slots to accommodate headrest posts with various spacings. Case 100 can be attached to or removed from adapter 200 without necessarily removing adapter 200 from seat 430. As in other examples, adapter 200 and/or adapter body 210 can be bent to achieve a preferred viewing angle.

FIG. 5 illustrates another adapter 200 for use with the components or systems disclosed herein. In the example of FIG. 5, attachment mechanisms 320 provide a different method of removably attaching handle 124 and handle attachment 120. Attachment mechanisms 320 may provide an interference fit, a friction fit, and/or a snap fit with handle 124 and may do so in more than one axis. FIG. 6 illustrates handle attachment 120 and handle 124 removably attached to adapter 200. As in other examples, case 100 may be attached to handle attachment 120 and the whole assembly used as illustrated in FIGS. 3A-3C.

FIGS. 5 and 6 also illustrate that at least adapter foot 205 may be a multilayer structure. In one example, it may contain an out layer on each side that is made of a relatively hard or stiff material. An inner layer may be made of a more pliable or flexible material and the inner layer may extend further into post receiver areas 225 than the out layers. In this way, the flexible material of the inner layer can conform around posts of different sizes to provide a relatively snug fit while the outer layers still provide stiffness to the overall structure.

FIG. 7 illustrates an alternate case 700 for use with an electronic device, such as a tablet computer. Case 700 is an example of case 100 and may have any of the features, elements, characteristics, and/or functions of case 100, including combinations thereof. Case 700 includes a handle 724. Handle 724 is an example of handle 124 and may have any of the features, elements, characteristics, and/or functions of handle 124, including combinations thereof. Handle 724 may have other shapes or sizes. Case 700 covers at least portions of the sides and back of an electronic device installed in case 700.

FIG. 8 illustrates an adapter 800, which may also be referred to as an arm. Adapter 800 is an example of adapter 200 and may have any of the features, elements, characteristics, and/or functions of adapter 200, including combinations thereof. Adapter 800 includes an adapter foot portion 805 and an adapter body portion 810. While specific shapes are illustrated in the figures herein, many other shapes are possible. Adapter 800 may include portions that may each be rigid, flexible, resilient, or bendable. The bendable portions

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are formed from a material which allows adapter **800** to be bent to a particular shape or angle by a user and stays in that general position when released by the user. Adapter foot portion **805** includes post receivers **825**. Post receivers **825** may include slots for accommodating headrest posts with various spacing. Adapter foot portion **805** may be formed from a flexible material that allows it to be temporarily bent to be removably engaged with headrest posts. The inner edges of post receivers may also include a more flexible, foamy, or spongy material to assist in maintaining a snug fit and/or to reduce unwanted vibration or movement around headrest posts.

FIG. **9** illustrates a rear view of the adapter **800** of FIG. **8**. Adapter **800** includes handle receiver **820** for receiving a shoulder portion of handle **724**. Handle receiver **820** may include a receiver area, a recess, a hole, a slot, one or more attachment mechanisms, threads, tabs, clips, snaps, ridges, a friction fit, and/or an interference fit for removably or releasably attaching or affixing adapter **800** to handle **724** and/or case **700**. Handle **724** may or may not rotate within handle receiver **820** and/or may have a locking feature to selectively and temporarily prohibit rotation.

FIG. **10** illustrates a rear view of case **700** with adapter **800** attached. FIG. **11** illustrates a side view of the assembly of FIG. **10**. Adapter foot portion **805** may be bent to various positions by a user similar to those of adapter **200** illustrated in FIGS. **2A-2D**. Adapter foot portion **805** may also be bent to various stand positions or to a stowed position similar to those of adapter **200** illustrated in FIGS. **3A-3C**.

FIG. **12** illustrates a rear perspective view of case **700** with adapter **800** attached. FIG. **13** illustrates an alternative rear perspective view of the assembly of FIG. **12**. Adapter **800** may be bent or positioned such that the assembly of FIGS. **10-13** may be used with a seat similar to the illustration of FIG. **4**. Other configurations are possible.

Any combination of the components or elements disclosed herein may be used together in the form of a system or kit. Any combination of the components disclosed herein may also be described as an accessory for an electronic device.

The elements, components, and steps described herein are meant to exemplify some types of possibilities. In no way should the aforementioned examples limit the scope of the invention, as they are only exemplary embodiments.

The phrases “in some embodiments,” “according to some embodiments,” “in the embodiments shown,” “in other embodiments,” “in some examples,” “in other examples,” “in some cases,” “in some situations,” “in one configuration,” “in another configuration,” and the like generally mean that the particular technique, feature, structure, or characteristic following the phrase is included in at least one embodiment of the present invention and/or may be included in more than one embodiment of the present invention. In addition, such phrases do not necessarily refer to the same embodiments or to different embodiments.

The foregoing disclosure has been presented for purposes of illustration and description. Other modifications and variations may be possible in view of the above teachings. The embodiments described in the foregoing disclosure were chosen to explain the principles of the concept and its practical application to enable others skilled in the art to best utilize the invention. It is intended that the claims be construed to include other alternative embodiments of the invention except as limited by the prior art.

What is claimed is:

**1.** A protective case system for use with an electronic device, the protective case system comprising:

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a protective case for removably receiving the electronic device, wherein a display screen of the electronic device remains visible when the electronic device is installed in the protective case;

a handle attached to and extending outward from a back surface of the protective case, wherein the handle is configured for carrying the protective case; and

an adapter attached to the handle, wherein the adapter is configured to be bendable to a plurality of positions and is configured to function as a multi-position stand for the protective case and the installed electronic device, and wherein the adapter is further configured to removably affix the protective case and the installed electronic device to headrest posts of a seat.

**2.** The protective case system of claim **1** wherein the adapter includes two post receivers configured for each receiving a respective one of the headrest posts.

**3.** The protective case system of claim **2** wherein the two post receivers of the adapter are spaced apart a same distance as a distance between the headrest posts.

**4.** The protective case system of claim **2** wherein each post receiver comprises a slot for accommodating, alternately, two or more sets of headrest posts having differing spacing.

**5.** The protective case system of claim **2** wherein a portion of the adapter including the two post receivers is formed from a flexible material.

**6.** The protective case system of claim **1** wherein the handle is removably attached to the protective case.

**7.** The protective case system of claim **1** wherein the handle is permanently attached to the protective case.

**8.** The protective case system of claim **1** wherein the adapter is removably attachable to the handle.

**9.** The protective case system of claim **8** wherein the adapter is removably attachable to the handle with an interference fit.

**10.** The protective case system of claim **8** wherein the adapter is removably attachable to the handle with a friction fit.

**11.** The protective case system of claim **1** wherein the attached adapter is rotatable relative to the protective case.

**12.** The protective case system of claim **1** wherein the adapter is bendable to at least a stowed position and two different stand positions.

**13.** The protective case system of claim **1** wherein the adapter is bendable to change a viewing angle of the installed electronic device when the protective case system and the installed electronic device are removably attached to the headrest posts of the seat.

**14.** A protective case system for use with a tablet computer, the protective case system comprising:

a protective case adapted for covering at least a portion of the tablet computer and removably retaining the tablet computer;

a handle attached to and extending outward from the protective case, wherein the handle is adapted for carrying the protective case and the tablet computer when the tablet computer is installed in the protective case; and

an adapter adapted to be removably attachable to the handle, wherein the adapter is bendable to a plurality of positions and is adapted to function as a stand for the protective case and the installed tablet computer, and wherein the adapter is further adapted to removably attach the protective case and the installed tablet computer to a seat.

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**15.** The protective case system of claim **14** wherein the attached adapter is rotatable relative to the protective case.

**16.** The protective case system of claim **14** wherein the adapter is bendable to at least a stowed position and two different stand positions, wherein each of the two different stand positions provides a different viewing angle for the installed tablet computer.

**17.** The protective case system of claim **16** wherein the adapter attaches to headrest posts of the seat and the adapter is bendable to change a viewing angle of the installed tablet computer when the protective case system is attached to the headrest posts of the seat.

**18.** An accessory for use with an electronic device, the accessory comprising:

a case for removably retaining and protecting the electronic device when the electronic device is installed in the case;

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a handle attached to and extending outward from the case, wherein the handle is configured for holding or carrying the case and the installed electronic device; and an arm configured to attach to the handle, wherein the arm is bendable by a user to a plurality of positions, wherein the arm is configured to function as a multi-position stand for the case and the installed electronic device, and wherein the arm includes one or more slots configured to removably affix the case and the installed electronic device to an automobile seat.

**19.** The accessory of claim **18** wherein the arm includes a rigid portion and a flexible portion, wherein the flexible portion is configured to removably attach the arm to headrest posts of the automobile seat.

**20.** The accessory of claim **18** wherein the arm is removably attachable to the handle with one or more of an interference fit and a friction fit.

\* \* \* \* \*